Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) An optical attenuator device selectively operable in a non-actuated state and an actuated state, comprising:

a waveguide for guiding optical energy, the waveguide having an input section coupled to an intermediate section, said intermediate section having reduced confinement of the optical energy relative to said input section, said intermediate section having a core and a cladding bounding said core, said core and cladding having matched thermo-optic coefficients, said core having a refractive index that is less than a refractive index of a core of said input section and greater than or equal to a refractive index of said cladding; and

a thermal source, disposed above said intermediate section, for generating a temperature gradient within a portion of said intermediate section along a vertical axis thereof when said device is in said actuated state, said temperature gradient being sufficient to alter a refractive index profile within said intermediate section such that a portion of said optical energy is deflected downwardly and extracted from said intermediate section.

2. (canceled)

3. (currently amended) The device of ~~claim 2~~ claim 1, wherein said core of said intermediate section has at least one transverse dimension that is significantly larger than a corresponding transverse dimension of a core of said input section.

4. (original) The device of claim 3, wherein said intermediate section is coupled to said input section by an adiabatic taper.

5. (original) The device of claim 1, wherein said waveguide further comprises an output section optically coupled to said intermediate section, said output section having increased confinement of the optical energy relative to said intermediate section.

6. (currently amended) The device of ~~claim 2~~ claim 1, wherein said core is segmented.

7. (canceled)

8. (currently amended) The device of ~~claim 7~~ claim 1, wherein said refractive index of said core of said intermediate section is equal to said refractive index of said cladding.

9. (original) The device of claim 8, wherein said core of said intermediate section and said cladding are formed from the same material.

10. (original) The device of claim 1, wherein said portion of said optical energy extracted from said intermediate section is adjusted by varying an electrical control signal applied to said thermal source.

11. (currently amended) The device of ~~claim 2~~ claim 1, wherein said core and said cladding are formed from polymeric materials.

12-15. (canceled)

16. (currently amended) ~~The device of claim 15 wherein~~ An optical attenuator device selectively operable in an actuated state and a non-actuated state, comprising:

a core;

a lower cladding layer downwardly bounding said core;

a substrate affixed to said lower cladding layer;

an adhesion layer interposed between said substrate and said lower cladding layer, said adhesion layer ~~has~~ having a refractive index which is less than the refractive index of said substrate and greater than or equal to the refractive index of said lower cladding layer;

a first upper cladding sublayer upwardly and laterally bounding said core, wherein said core, said lower cladding layer and said first upper cladding sublayer have matched thermo-optic coefficients;

a second upper cladding sublayer upwardly adjacent to said first upper cladding sublayer and having a refractive index substantially lower than the refractive index of said first upper cladding sublayer; and

a resistive heater positioned above said core, said resistive heater being configured to generate a thermal gradient within said core, when said attenuator device is in the actuated state, such that the refractive index of a portion of said core is decreased below the refractive index of a portion of said lower cladding layer located downwardly adjacent to said core, causing a portion of the optical energy traveling along said core to be deflected downwardly and extracted from said core.

17. (currently amended) The device of ~~claim 13~~ claim 16, wherein said core, said lower cladding layer, said first upper cladding sublayer, and said second upper cladding sublayer all comprise polymeric materials.

18. (currently amended) The device of ~~claim 13~~ claim 16, wherein said portion of

said optical energy extracted from core is adjusted by varying an electrical control signal applied to said resistive heater.

19. (currently amended) ~~The device of claim 13, wherein~~ An optical attenuator device selectively operable in an actuated state and a non-actuated state, comprising:

a core;

a lower cladding layer downwardly bounding said core;

a first upper cladding sublayer upwardly and laterally bounding said core, wherein said core, said lower cladding layer and said first upper cladding sublayer have matched thermo-optic coefficients;

a second upper cladding sublayer upwardly adjacent to said first upper cladding sublayer and having a refractive index substantially lower than the refractive index of said first upper cladding sublayer; and

a resistive heater positioned above said core, said resistive heater ~~is~~being configured to and being capable of generating an average vertical thermal gradient within said core of at least 0.53°C/μm, when said attenuator device is in the actuated state, such that the refractive index of a portion of said core is decreased below the refractive index of a portion of said lower cladding layer located downwardly adjacent to said core, causing a portion of the optical energy traveling along said core to be deflected downwardly and extracted from said core.

20. (currently amended) ~~The device of claim 13, wherein~~An optical attenuator device selectively operable in an actuated state and a non-actuated state, comprising:

a core;

a lower cladding layer downwardly bounding said core;

a first upper cladding sublayer upwardly and laterally bounding said core, wherein said core, said lower cladding layer and said first upper cladding sublayer have matched thermo-optic coefficients;

a second upper cladding sublayer upwardly adjacent to said first upper cladding sublayer and having a refractive index substantially lower than the refractive index of said first upper cladding sublayer; and

a resistive heater positioned above said core, said resistive heater ~~is~~being configured to and being capable of generating an average vertical thermal gradient within said core of at least 0.67°C/μm, when said attenuator device is in the actuated state, such that the refractive index of a portion of said core is decreased below the refractive index of a portion of said lower cladding layer located downwardly adjacent to said core, causing a portion of the optical energy traveling along said core to be deflected downwardly and extracted from said core.

21. (currently amended) ~~The device of claim 13, wherein said~~An optical attenuator device selectively operable in an actuated state and a non-actuated state, comprising:

a core;

a lower cladding layer downwardly bounding said core;

a first upper cladding sublayer upwardly and laterally bounding said core, wherein said core, said lower cladding layer and said first upper cladding sublayer have matched thermo-optic coefficients;

a second upper cladding sublayer upwardly adjacent to said first upper cladding sublayer

and having a refractive index substantially lower than the refractive index of said first upper cladding sublayer; and

a resistive heater ~~is~~ positioned above said core but no more than 5 μm above an upper boundary of said core, said resistive heater being configured to generate a thermal gradient within said core, when said attenuator device is in the actuated state, such that the refractive index of a portion of said core is decreased below the refractive index of a portion of said lower cladding layer located downwardly adjacent to said core, causing a portion of the optical energy traveling along said core to be deflected downwardly and extracted from said core.

22. (currently amended) The device of ~~claim 13~~ claim 16, wherein the portion of optical energy extracted from said core may be varied in a range between around 0% to around 99.9%.

23-24. (canceled)

25. (new) The device of claim 19, wherein said core, said lower cladding layer, said first upper cladding sublayer, and said second upper cladding sublayer all comprise polymeric materials.

26. (new) The device of claim 19, wherein said portion of said optical energy extracted from core is adjusted by varying an electrical control signal applied to said resistive heater.

27. (new) The device of claim 19, wherein the portion of optical energy extracted from said core may be varied in a range between around 0% to around 99.9%.

28. (new) The device of claim 20, wherein said core, said lower cladding layer, said

first upper cladding sublayer, and said second upper cladding sublayer all comprise polymeric materials.

29. (new) The device of claim 20, wherein said portion of said optical energy extracted from core is adjusted by varying an electrical control signal applied to said resistive heater.

30. (new) The device of claim 20, wherein the portion of optical energy extracted from said core may be varied in a range between around 0% to around 99.9%.

31. (new) The device of claim 21, wherein said core, said lower cladding layer, said first upper cladding sublayer, and said second upper cladding sublayer all comprise polymeric materials.

32. (new) The device of claim 21, wherein said portion of said optical energy extracted from core is adjusted by varying an electrical control signal applied to said resistive heater.

33. (new) The device of claim 21, wherein the portion of optical energy extracted from said core may be varied in a range between around 0% to around 99.9%.